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CLEAR ORAL COMPOSITIONS CONTAINING POTASSIUM SALT

This application is a continuation U.S. patent application Ser. No. 10/042,712, filed on Mar. 21, 2002, now abandoned which is a continuation of U.S. patent application Ser. No. 09/503,431, filed on Feb. 14, 2000, now abandoned which claims the benefit of U.S. Provisional Patent Application No. 60/124,258, filed on Mar. 12, 1999, the entirety of which is hereby incorporated by reference as if fully set forth herein.

FIELD OF THE INVENTION

The present invention relates to detergent compositions useful in the healthcare and hard surface and fabric cleaning fields.

BACKGROUND OF THE INVENTION

Sodium alkylsulfate surfactants, e.g., sodium lauryl sulfate (SLS), are generally not substantially compatible with compounds that contain potassium because an insoluble potassium alkyl sulfate precipitate forms when the sodium alkylsulfate is combined with a potassium salt. While the solubility of SLS in water is about 10% on a gram per gram basis, experiments indicate that the solubility of potassium lauryl sulfate is less than approximately 0.02%.

Thus, many aqueous compositions which contain SLS cannot contain a potassium salt which might otherwise be useful as an active ingredient. If the potassium salt and SLS do coexist in a composition, the usefulness of that potassium salt is not being optimized since a portion of the potassium ion of the salt is being occupied in the insoluble potassium lauryl sulfate precipitate. Alternatively, if a potassium salt is a required ingredient in a composition, nonionic surfactants can be used instead of SLS to avoid a potassium lauryl sulfate precipitation. However, such nonionic surfactants are in many instances not as effective as SLS as wetting or cleaning agents. For example, oral care compositions which contain nonionic surfactants instead of SLS are not as effective in removing dental plaque. It would thus be beneficial in the healthcare and surface and fabric cleaning fields if SLS could be combined with a potassium salt without forming an insoluble potassium lauryl sulfate precipitate.

Numerous potassium salts are useful in detergent compositions. Potassium pyrophosphate salts, for example, can have detergent building activity in detergent compositions that comprise a wetting agent such as SLS. However, the detergent building activity of the potassium pyrophosphate salt in such compositions may not be optimal due to the formation of the potassium lauryl sulfate precipitate described above. For example, U.S. Pat. No. 5,338,538 to Tricca et al. relates to liquid compositions for loosening and removing plaque that comprise SLS and a detergent builder selected from dialkali metal pyrophosphate salts, tetraalkali metal pyrophosphate salts, and mixtures thereof. The preferred pyrophosphate salts are disodium pyrophosphate and tetrasodium pyrophosphate. It may be useful to be able to add potassium pyrophosphate salts to compositions such as those referred to in U.S. Pat. No. 5,338,538. This is because potassium pyrophosphate salts can be more soluble than sodium pyrophosphate salts and a higher concentration of pyrophosphate in solution could, thus, be achieved. Also, replacing all or some sodium pyrophosphate salt with potassium pyrophosphate would reduce the sodium content of the oral composition, which some consumers may find preferable.

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Furthermore, many potassium salts possess therapeutic activities which are useful in healthcare compositions. For example, several potassium salts are believed to possess activity in reducing dental nerve and/or dentin sensitivity. Such potassium salts could therefore be included in oral compositions designed for the treatment of sensitive teeth and gums. U.S. Pat. No. 4,751,072 to Kim, for example, relates to a method for reducing sensory nerve activity in hypersensitive teeth and for desensitizing hypersensitive dentin that involves applying a potassium salt selected from potassium bicarbonate and potassium chloride. Also, U.S. Pat. No. 5,403,577 to Friedman refers to a sustained-release oral composition for treating and preventing dental hypersensitivity comprising an anti-hypersensitivity agent selected from a group of active ingredients including potassium nitrate, potassium bicarbonate, and potassium chloride. Moreover, potassium ions are believed to block nerve conduction in vitro (Peacock, J., and Orchardson, R., 1995, J. Dent. Res. 74(2):634-641). However, any SLS present in such a sensitivity composition comprising a potassium salt may result in the formation of the aforementioned insoluble potassium lauryl sulfate precipitate.

SUMMARY OF THE INVENTION

The subject invention provides an oral composition comprising:

a) from about 0.01% by weight to about 20% by weight of an active ingredient which is an orally-acceptable, soluble potassium salt;

b) from about 0.01% by weight to about 10% by weight of a sodium (C_8-C_{24}) alkylsulfate;

c) from about 0.01% by weight to about 20% by weight of an orally-acceptable polar surfactant, said surfactant comprising a hydrophobic portion selected from a (C_6-C_{30}) alkyl group and a polymeric silicone group; and

d) an orally-acceptable aqueous vehicle; wherein the molar ratio of the surfactant of (c) to the sodium (C_8-C_{24}) alkylsulfate of (b) is greater than or equal to about 1:1.

The subject invention further provides an oral composition as recited above, suitable for loosening or removing plaque and/or stains present on dental surfaces, wherein the soluble potassium salt of the composition comprises a potassium pyrophosphate salt in an amount effective, optionally in combination with other pyrophosphate salts, to remove or loosen plaque and/or stains when the composition is orally applied to a dental surface.

The subject invention further provides an oral composition as recited above, suitable for reducing dental nerve and/or dentin sensitivity, wherein the soluble potassium salt of the composition comprises a potassium salt capable of reducing dental nerve and/or dentin sensitivity in an amount effective to reduce dental nerve and/or dentin sensitivity when the composition is orally applied to a dental surface.

The subject invention further provides an oral composition for reducing dental nerve and/or dentin sensitivity comprising an effective amount of an ingredient that possesses activity in reducing dental nerve and/or dentin sensitivity, an orally-acceptable vehicle, and a flavoring that does not contain a substantial amount of menthol, said flavoring in an amount effective to provide flavor to said composition.

The subject invention further provides a mint flavoring that does not comprise a substantial amount of menthol, said mint flavoring being either a dementholated natural mint extract or a synthetic blend.